

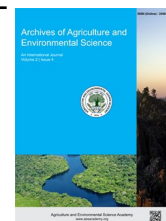


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CASE STUDY



Assessing socio-economic patterns and trends of livelihoods of fisher's community of the Old Brahmaputra River: A case study in Jamalpur, Bangladesh

Md. Fakhru Islam* , Muhammad Forhad Ali, Mohammad Shadiqur Rahman, Syed Ariful Haque and Runa Akther Juthi

Department of Fisheries, Bangamata Sheikh Fojilatunnesa Mujib Science and Technology University, Melandah, Jamalpur - 2012, BANGLADESH

*Corresponding author's E-mail: fakhru@bsfmstu.ac.bd

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ABSTRACT

The current study was assessed the socio-economic patterns and trends of livelihoods of the Old Brahmaputra River fisher's community in the Jamalpur district from July 2021 to June 2022. The livelihood status was analyzed regarding age distribution, family size and composition, religion, marital status, education levels, living standards, diseases, healthcare, electricity, sanitation, drinking water facilities, fishing, and employment status. Most fishermen (45.76%) were 35-50 years old, with 91.53% were Muslim. The average family size for a fisher was medium, with 5-7 members. 33.9% were illiterate, 37.29% could only sign, 20.34% finished primary school, and 8.47% completed SSC. Most fishermen had tin roofs 59.32%, straw roofs 22.03%, semi-paka houses 11.87%, and paka houses 6.78%. Approximately 45.76% of fishers relied on village doctors, 33.9% on the Upazila Health Complex, 8.47% on Kobiraj, and 11.87% on MBBS doctors. Approximately 93.22% of fishermen's homes were equipped with electricity. Fishing was the main activity for more than 57.63% of the fishers. Fishermen have suggested specific management strategies to halt the trend of decreasing fish catches and increasing fish production. These include restricting the use of harmful gear, prohibiting the catching of juvenile fish, creating fish sanctuaries, and releasing fish fry.

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INTRODUCTION

The Brahmaputra River is a trans-boundary and one of the principal rivers in Asia. In Bangladesh, the Brahmaputra River is amalgamated by Tista River and then the Brahmaputra River splits into two distributary branches- the western branch and eastern branch. The eastern branch is called the Old Brahmaputra River which flows south-east through Jamalpur and Mymensingh for about 200 km towards the Meghna River in Kishoreganj district (Wikipedia, 2019). Many waterbodies, including as rivers, haors, baors, beels, ponds, floodplains, and marshes may be found throughout our country and are valuable fishery resources (Debnath *et al.*, 2019). Bangladesh is a riverine country with extensive inland waterways (Akanda *et al.*, 2020).

At the early commencement of human civilization, fish is considered as one of the utmost significant food items all over the world including Bangladesh (Kabir *et al.*, 2012, Hossain *et al.*, 2012). Now, Bangladesh ranked as 3rd in inland capture fisheries production and 5th in aquaculture production in the world (FAO, 2018). Fishing is the crucial and only means of livelihood available for amateur and traditional fishing communities in the Old Brahmaputra River (Mahmud, 2013). Exporting fish, shrimp, and other fisheries products brought in a significant amount of foreign currency to Bangladesh. (Islam *et al.*, 2021a). Bangladesh is an agro-based country where 40.6% of the total population is involved in agricultural activity (Economic Survey, 2019) and 63.37% of the total population are rural people (World Bank, 2018). The total fish production in Bangladesh was estimated at

43.84 lakh MT in 2018-19. Fisheries sector contributes 3.50% to the national GDP and 25.72% to the agricultural GDP (DoF, 2020). Now, Bangladesh attained self-sufficiency in fish production with a per capita fish consumption of 62.58 g/day against set target of 60 g/day (BBS, 2016). Fish production and marketing is the integral part for the socio-economic development of fishermen community in the agro-based country like Bangladesh (Haque *et al.*, 2021). To protect fish species and expand fish output for future generations, researchers should look at conservation and aquaculture production tactics that could help fishermen make a living (Hasan *et al.*, 2021; Bithy *et al.*, 2012; Islam *et al.*, 2011). Fishers are one of the most susceptible communities in Bangladesh and most of them are live from hand to mouth (Ali *et al.*, 2014). Fisheries sector is one of the prominent incomes and employment-generating sector in Bangladesh. About 12% of the total population of the country directly or indirectly dependent on fisheries and aquaculture related activities for their livelihoods (DoF, 2020). Therefore, for plummeting the rural poverty as well as taming the food security of the poor, prioritizing the agricultural sectors like fisheries is important (Toufique, 2017). The Old Brahmaputra River is one of the most important lotic environments in Bangladesh with much aquaculture budding which flow across the Jamalpur district. The vast number of fish are caught from this river in every year. This river plays a vigorous role in the palliation of rural poverty and supplying of food to the poor fisher communities. But the biodiversity and production of fish in this river have been diminishing day by day due to lack of proper management policy and over exploitation.

However, livelihood and socio-economic status of the fishermen of the Old Brahmaputra River is not satisfactory. In light of this, the primary goal of this research is to evaluate the socio-economic status and livelihood patterns of fishermen of the Old Brahmaputra River.

MATERIALS AND METHODS

This study was conducted for a period 12 months from July 2021 to June 2022. Fishermen from Dewangonj, Islampur, Melandah, and Sadar Upazilas in Jamalpur district along the Old Brahmaputra River have been subjected to an investigation. The data for this study was gathered from both primary and secondary sources. Before collecting primary data, a draft questionnaire was designed and pre-tested with a small group of fishermen, with information being added or rejected as needed. The final questionnaire was revised, reshuffled, and adjusted based on the results of the pre-testing. The final questionnaire included the questions on the socio-demographic condition, income sources, annual income, credit access and factors affecting the level of fish production of Old Brahmaputra River. Upazila Fisheries Offices and District Fisheries Offices provided the necessary important information on the socio-economic state of fishermen. Questionnaire interviews (basic random sampling approach), Participatory Rural Appraisal (PRA) tools such as Focus Group Discussion (FGD), and Crosscheck Interviews (CI) with key informants were used to obtain primary data from 118

fishermen. During fishing, the fishermen were interviewed at river sites. All of the data was coded and entered into a database system and Microsoft® Excel 2019 was used to analyze it. These data were double-checked to ensure that there were no errors or discrepancies. After analyzing the data, the findings were presented in textual, tabular, and graphical formats to help comprehend the current state of the fishermen's livelihood.

RESULTS AND DISCUSSION

Socio-demographic profile of fishermen

Age composition: In a particular population, age composition refers to the proportionate number of people in each age group. The fishing communities were divided into three age categories depending on their age range: 20-35 years, 36-50 years and above 50 years. In the present study, 22.04% has 20-35 years, 45.76% has 35-50 years and 32.20% has above 50 years (Figure 1). Rahman *et al.* (2016) noted that the highest age groups were 20-35 years and 36-50 years (37.5 percent), while the lowest age group was over 50 years (25 percent) in the Eshulia Beel which is more or less similar to the present findings. Similar results also reported by Kabir *et al.* (2012) that in the vicinity of the Old Brahmaputra River, the majority of the fisherman (50 percent) were between the ages of 31 and 40. Baki *et al.* (2015) was found that in Dhaka near the Turag-Buriganga River, 48 percent of respondents in the 31-40 age group.

Family size: Family size is an important socioeconomic indicator that determines the family's position and interconnectedness with other families, as well as between and within communities. Respondents were classified into three groups in this study based on the number of family members. The 5 to 7 membered family had the highest percentage of participation (45.76%), while the 2 to 4 membered family had the lowest percentage (25.42%). Roy *et al.* (2020) also observed similar findings. Abdullah *et al.* (2013) stated that the majority (48%) of fisherman in Baluhar Baor, have a small family (members fewer than five).

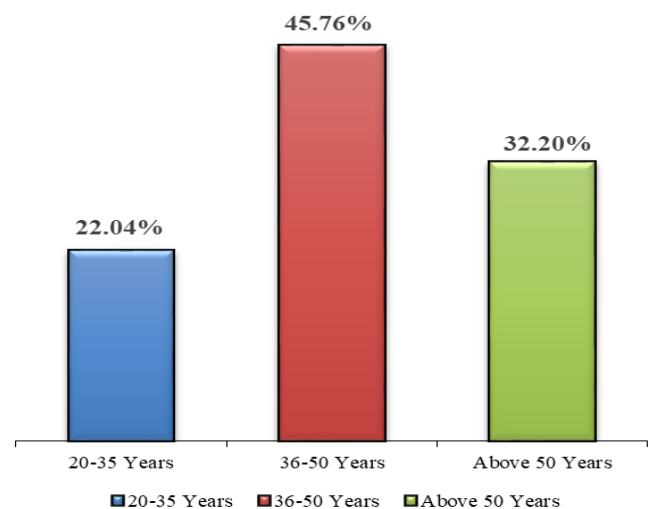


Figure 1. Age composition of the respondent community.

Family type: There are two sorts of families in rural Bangladesh: (1) nuclear family: married couples with children who are members of two generations (parents and children); (2) joint family: three or more generations of persons linked by blood or by law. In this survey, 52.54 % of the families were nuclear, while 47.46 % were joint (Table 1). The results were in agreement with Islam *et al.* (2021b) who found joint family represented for 33% of the total, while a nuclear family represented for 67%. Bappa *et al.* (2014) stated that fishermen surrounding the Marjat Baor in Kaligonj, Jhenidah district, were found to have 44% joint and 56% nuclear families, which is similar to current figures.

Religious status: The majority of the fisherman (91.53%) were Muslims, while the remaining 8.47% were Hindus, according to the religion distribution of survey responses (Table 1). Hossen *et al.* (2020a) also observed similar findings. Mondal *et al.* (2016) noted that near the Jamuna River in Sariakandi, about 87% and 13% of riverine fisherman were Muslims and Hindus which is similar to current figures.

Marital status: The respondents' marital status is an essential social aspect that can influence their livelihood position. Young and unmarried people may be hesitant to participate in fishing because it is arduous work. Married folks, on the other hand, have a lot of duties. As a result, they must get involved because it is a conveniently available source of income to maintain their family. In the present study, the majority of the fisherman (89.83%) were married, while the remaining 10.17% were unmarried (Table 1). Afrad *et al.* (2019) have found that the majority of the fisherman (83.7%) were married, while the remaining

16.3% were unmarried which is similar to current figures. Paul *et al.* (2013) reported that the majority of respondents from both Birulia (98%) and Boroibari (96%) got married in Turag River.

Educational qualification: Individual performances, skills, and behavioral patterns are all heavily influenced by educational qualifications. The fishermen were divided into four groups based on their educational levels: (i) Illiterate (ii) Sign only (iii) Primary level (up to V) (iv) Secondary level (up to X). In the current survey, 33.9% of fishermen were illiterate, 37.29% can sign only, with 20.34% having completed basic school and 8.47% having completed secondary school (Figure 2). Similar results also reported by Afrad *et al.* (2019) that majority of riverine fishermen (41.3%) could only sign, with 26.0 percent having no schooling, 22.7 percent having primary education (up to class 5) and 10.0 percent having completed SSC (Class X) in Titas River. In the Eshulia Beel, it was found that 32.5 percent of the population was illiterate, 40 percent could only sign, 15 percent had completed primary school, 7.5 percent had completed secondary school, and 5 percent had completed higher secondary school (Rahman *et al.*, 2016).

Housing condition: The socioeconomic level of the fishermen's community was represented by the nature of the dwelling. According to the results of the survey, 59.32% of fisherman's dwellings had tin roofs, 22.03% had straw roofs, 11.87% had semi-paka houses, and 6.78% had paka houses. (Figure 3). Rahman *et al.* (2016) have found that in the Eshulia Beel at Gouripur upazila, Mymensingh, 75 percent of fishermen had katcha houses, 17.5 percent had tin sheds, and only 7.5 percent had half-built structures.

Table 1. Socio-demographic profile of the fishermen of Old Brahmaputra River.

Variables	Categories with percentage (%)	Total	No. of respondents (118)
Family size	2 to 4 member (25.42%)	100%	30
	5 to 7 member (45.76%)		54
	Above 7 member (28.82%)		34
Family type	Nuclear	100%	62
	Joint		56
Religious status	Muslim (91.53%)	100%	108
	Hindu (8.47%)		10
Marital status	Married (89.83%)	100%	106
	Unmarried (10.17%)		12
Diseases	Fever (33.9%)	100%	40
	Dysentery, jaundice & gastric (23.73%)		28
	Respiratory disease (13.56%)		16
	Arthritis & aches (11.86%)		14
	Others (16.95%)		20
Sanitation facilities	Kacha toilets (49.15%)	100%	58
	Semi paka toilets (42.38%)		50
	Paka toilets (8.47%)		10
Electricity facilities	Present (93.22%)	100%	110
	Absent (6.78%)		8
Land properties	Land less	100%	82
	Small farm land		28
	Large farm land		8
Drinking water facilities	Own tube well (91.53%)	100%	108
	Other tube well (8.47%)		10

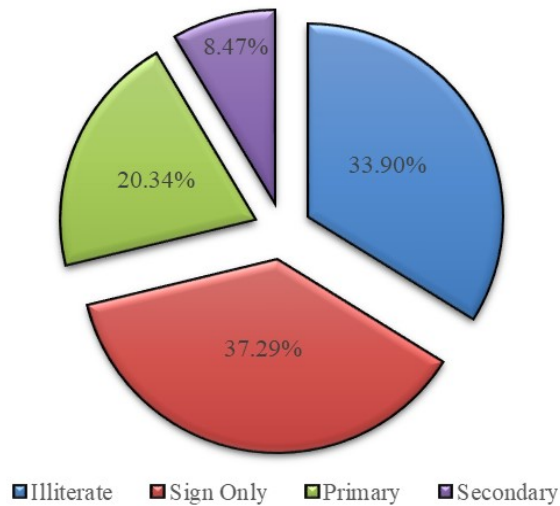


Figure 2. Educational status of the respondent community.

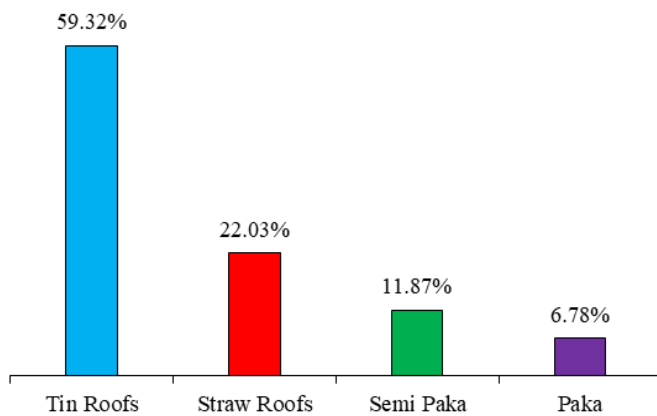


Figure 3. Housing condition of the respondent community.

Diseases: Body aptitude assures a high level of productivity for any fisherman because physical and mental health are inextricably linked. According to the survey, the foremost health problem for 33.9% of fishermen is any type of fever, 23.73% from dysentery, jaundice and gastric, 13.56% from respiratory disease like pneumonia and asthma, 11.86% from arthritis and aches and the rest 16.95% have other diseases (Table 1). Rahman *et al.* (2021) have noted that 36% fishermen suffered from gastrointestinal disease, 34% from diarrhoea and dysentery, 23% from fever and 7% from other diseases in the Chalan Beel.

Health facilities: Fishermen's health facilities were poor in the research area and it was observed that fisher villages were found to be 45.76% reliant on village doctors, 33.9% on Upazila Health Complex, 8.47% on Kobiraj, and 11.87% on MBBS doctors. (Figure 4). Mondal *et al.* (2016) noted that near the Jamuna River in Sariakandi, 68.5% of the fishermen households were dependent on village doctors, 21.5% got health service from Upazila Health Complex and remaining 10% from MBBS doctors which is similar to current figures.

Sanitation facilities: In general, a person's health profile is determined by sanitary conditions, which include proper fecal waste disposal. In the study area, the majority of the fisherman

(49.15 percent) had a Kacha toilet (an unsanitary or unimproved latrine). While 42.38 percent of the fishermen used a sanitary Semi paka toilet with at least a slab and just 8.47 percent used an enhanced Paka or cemented sanitary latrine with a deep flush and drainage system (Table 1). The present findings are similar with Roy *et al.* (2020) who found 45% fishers used kacha toilets where 36% used semi paka and 8.6% used paka toilets in the Shibs River.

Electricity facilities: Rural electrification is one of the most basic requirements for socio-economic growth (Taheeruzzaman and Janik, 2016). The present survey revealed that 93.22% of fishermen house were linked with electricity line (Table 1). The present results are similar with Afrad *et al.* (2019) who found only 6.3 percent of respondents did not have access to electricity, while 93.7 percent did. Roy *et al.* (2020) noted that in the Shibs River, 69.3 percent of fishermen's families had access to power.

Land properties: Depending on the land properties, fishermen were divided into three groups such as land less (only house land), small farm land (1-25 decimals) and large farm land (above 25 decimals). According to the survey, 69.5% fishermen were land less, 23.72% had small farm land and 6.78% had large farm land respectively (Table 1). Rahman *et al.* (2015) have found that 46% of fisherman had no land, 38% had 1-20 decimal and 16% had lands over 20 decimals in the Talma River of Northern Part of Bangladesh.

Drinking water facilities: According to the survey, 100% of fisher households used tube-well water for drinking, with 91.53% having their own tube-well and the rest 8.47% using a neighbor's tube-well (Table 1). Abdullah *et al.* (2013) stated that 100 percent of fishermen's households drank tube-well water where 96 percent using their own tube-wells and 4% using neighbors' tube-wells in Baluhar Baor which is parallel to the current findings.

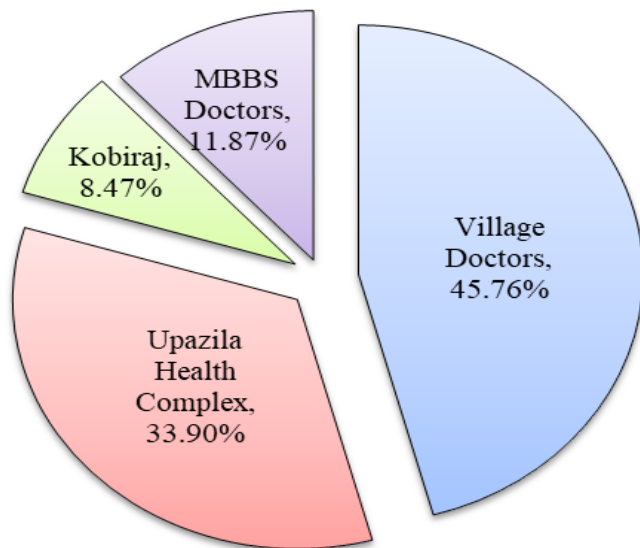
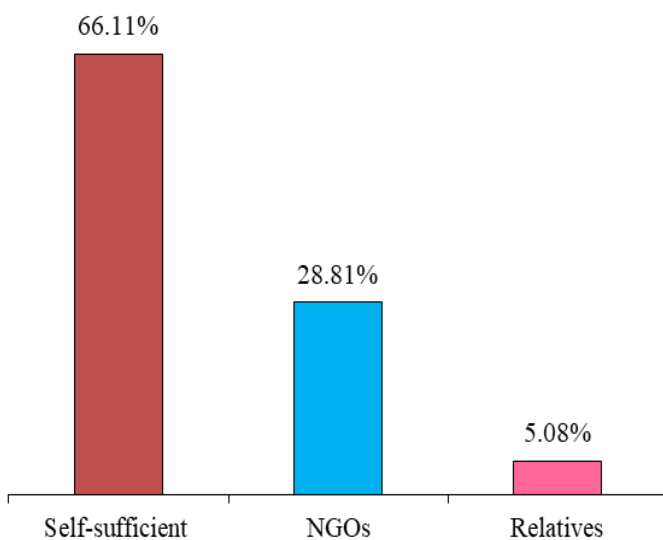
Job-related profile

Fishermen type: The fishery sector's income is dwindling day by day, and the majority of the people are still poor, unable to meet basic demands. As a result, 37.28% of respondents have switched to other sources of income and capture fish seasonally, whereas 62.72% of fishermen continue to fishing all year (Table 2) which is more or less parallel to Hossen *et al.* (2020b) who found 47 and 33 percent full-time and part-time fishermen in Barisal District, Southern Bangladesh.

Purpose of fishing: For the participation in fishing, water bodies access is a major motivator and fishing is an ordinary choice among the agricultural livelihood strategy. According to the results of the survey, 59.32% of fisherman capture fish for both commercial purpose and personal usage where 30.5% and 10.18% for commercial and family purposes (Table 2). Similar results also reported by Roy *et al.* (2020).

Table 2. Job-related profile of the fishermen of Old Brahmaputra River.

Variables	Categories with percentage (%)	Total	No. of respondents (118)
Fishermen type	Full-time (62.72%)	100%	44
	Part-time (37.28%)		74
Purpose of fishing	Commercial and personal (59.32%)	100%	70
	Commercial (30.5%)		36
	Family (10.18%)		12
Training exposure	Receive training	100%	6
	Receive no training		112
Occupational status	Fishing (57.63%)	100%	68
	Agriculture (18.64%)		22
	Daily work (10.17%)		16
	Livestock rearing (13.56%)		12
Fish marketing system	Consumers (35.6%)	100%	42
	Retailer or another farmer (50.84%)		60
	Others (13.56%)		16

**Figure 4.** Health condition of the respondent community.**Figure 5.** Credit access of the respondent community.

Training exposure: Results of the study revealed that only 5.08% of fishermen receive training, according to the current survey, while 94.92% receive no training at all (Table 2) which was more or less similar to the findings of Islam *et al.* (2021b) in Dengar beel under Melandah Upazila, Jamalpur. Fishermen's training in current fishing techniques and knowledge of the causes of biodiversity loss should be improved.

Occupational status: Fishing was the primary activity of the majority of the fishermen in the Old Brahmaputra River basin. Some, on the other hand, worked mostly in agriculture, livestock rearing, and day labor. In the study region, fishing was the primary occupation of 57.63% of fishers, agriculture was the primary occupation of 18.64%, daily work was 10.17%, and livestock rearing was the primary occupation of 13.56% (Table 2). The findings of this study are consistent with those of Kabir *et al.* (2012) who found that 70 percent of fishermen worked in fishing as their primary activity, 20 percent in agriculture and ten percent in daily labor.

Credit access: Several organizations in the study region, including banks and non-governmental organizations (NGOs) such as Grameen Bank, BRAC, Proshika, SSS, Asha, and others, provide loans to fishermen for the purchase of fishing gear, nets, and boats. In the present study, it was shown that 66.11% of fishermen had become self-sufficient and did not require financial assistance, but 28.81% borrowed money from non-governmental organizations (NGOs) and 5.08% borrowed money from relatives (Figure 5). In the old Brahmaputra River in Bangladesh, Kabir *et al.* (2012) found similar results.

Fish marketing system: According to the survey, 35.6% of respondents directly sold their collected fish to consumers, while 50.84% to a retailer or another farmer and 13.56% to others (Table 2). Khan *et al.* (2013) found that in the Tista River, 45% fishers vended the caught fish to consumer where 35% to retailer and 20% to others which was more or less similar to current findings.

Nets and gear used for fishing: Fishermen utilized a variety of nets and gears including Jhaki jal, Thella jal, Ber jal, Current jal, Moiya jal, Dharma jal, Khara jal, Taira jal, Bair, Borshi and Chandi bair in the Old Brahmaputra River. Bhuyan and Islam (2016) reported that parallel net patterns were also used to catch fish in the Meghna River.

Socio-economic constraints of the fishers

During fishing and other socioeconomic pursuits, the majority of the fishermen encountered a variety of challenges. The main issue was identified as a lack of education caused by poverty. The majority of the fishermen were impoverished, with little money to acquire nets and other fishing equipment. In society, they are ignored in every way. As a result, they continue to be illiterate, unable to contribute to the advancement of their community from generation to generation.

Conclusion

From the above discussion, it can be inferred that the fishers of the Old Brahmaputra River were largely illiterate, lacking in training exposure, unaware of health facilities, and preferring to save money for future socioeconomic management. The fishers should have easy access to loan options from banks and other institutions with reasonable terms and conditions. In addition, the biodiversity of the Old Brahmaputra River has been declining day by day due to over exploitation, which has hampered their socioeconomic situation.

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Conflict of interests

None to declare.

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